

Research report

Suicidal behavior in patients with major depression and comorbid personality disorders

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Received 18 April 1995; revised 29 June 1995; accepted 25 January 1996

Abstract

We investigated the relationship of DSM-III-R personality disorder (PD) diagnoses and traits to suicidal behavior in patients with Major Depressive Disorder (MDD). Axis I and Axis II criteria and suicidal behavior were assessed using structured interviews of 102 psychiatric inpatients. Subjects with comorbid MDD and Borderline PD (BPD; $n = 30$) were more likely than other patients to have a history of multiple suicide attempts, and were equally likely to have made a highly lethal attempt. Number of BPD and other Cluster B (dramatic/erratic) criteria were better predictors of past suicidal behavior than were depressive symptoms. We conclude that patients with BPD symptomatology are at risk for serious suicide attempts. Moreover, severity of comorbid Cluster B PD psychopathology should be considered when assessing suicide risk in MDD patients even in those without a PD diagnosis.

Keywords: Depression; Personality disorder; Suicidal behavior

1. Introduction

Patients with Major Depressive Disorder (MDD) have a relatively high likelihood of suicidal thoughts and acts (Vieta et al., 1992). The lifetime rate of completed suicide in patients with affective disorders has been estimated to be as high as 15%, or 30 times the likelihood in the general population (Guze and Robins, 1970). Completed suicide is a statistically rare event, however, even in patients with major affective disorders, with an annual rate of about 60/100 000 (Pokorny, 1964). It is difficult to detect

predictors of rare events, leading many investigators to focus on determining risk factors for suicide attempts, the annual rate of which is estimated to be 10–30-times higher than that for completions (Weissman, 1974). Whereas studies have identified some demographic and clinical factors associated with an increased risk of suicide completion in patients with major affective disorders (such as being male, living alone and having a sense of hopelessness about the future) (Barracough and Pallis, 1975; Roy, 1982; Fawcett et al., 1987; Beck et al., 1989), the best predictor of future suicidal behavior appears to be a history of a past suicide attempt (Barracough and Pallis, 1975; Roy, 1982; Goldstein et al., 1991). Within the population of patients with affective disorders, studies have identified some risk factors for

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suicide attempts, including suicidal ideation, marital isolation, earlier onset of depression and comorbid alcoholism (Bulik et al., 1990; Roy, 1993). However, a complete explanation of what distinguishes those depressed patients who attempt suicide from those who do not, so far has been elusive. Despite the significant risk of suicide attempts and completed suicide in depressed patients, the presence and severity of major depression alone is not a clinically useful predictor of either future suicide or suicidal behavior (Pokorny, 1964; Hawton, 1987; Malone et al., 1992).

Some investigations have focused on trait-related risk factors for suicidal behavior, including biological and personality variables. Studies have produced evidence for the existence of neurobiological trait-related correlates of suicidal behavior (Mann, 1987). Decreased central serotonergic function correlates with suicidal acts in patients with major depressive disorder (Mann et al., 1992; Coccaro et al., 1989) and with impulsivity and aggressive dysregulation in patients with personality disorders without major depression (Coccaro et al., 1989; Bourgeois, 1991; Coccaro, 1992). A relationship between externally-directed and self-directed aggression is supported by reports of increased aggression, hostility and/or impulsivity in suicide attempters compared to non-attempters (Brown et al., 1979; Brown et al., 1982; Frances et al., 1986). Thus, the study of personality variables such as impulsivity, hostility and trait-related anxiety and depression may provide important information in the effort to formulate a more complete explanatory model of suicidal behavior.

The DSM-III-R (American Psychiatric Association, 1987) personality disorders (PDs) represent personality trait constellations in extreme, rigid form (Wiggins and Pincus, 1989; Widiger and Trull, 1992; Soldz et al., 1993). Patients with PDs characterized by personality traits such as aggression, hostility, or impulsivity may thus be expected to exhibit an increased risk for suicidal behavior. Indeed, those PDs in the DSM-III-R dramatic/emotional/erratic cluster (Cluster B) are commonly associated with a history of suicidal and self-destructive behaviors (Frances et al., 1986; Siever and Davis, 1991). Within this cluster of disorders, Borderline PD combines the particularly risky features of impulsive aggression and affective instability (Coccaro and Kavoussi,

1991) and has been shown to relate to increased risk of suicidal behavior and completed suicide (Paris et al., 1987; Stone et al., 1987; Raczek et al., 1989). We have hypothesized that certain patients possess a trait vulnerability for suicidal behavior, perhaps having a lower threshold for suicidal acts, that places them at especially high risk for suicidal behavior during an episode of major depression (Mann, 1991; Malone et al., 1993). Further, we believe that the behavioral aspects of this trait vulnerability are most evident in patients with personality disorder psychopathology. The study of patient populations with Major Depressive Disorder (MDD) and varying levels and types of PD features provides a useful way to determine which of these dysfunctional personality traits are most closely correlated with a risk for suicidal behavior during a depressive episode. Moreover, such comorbid populations are not at all uncommon, given that studies have estimated the prevalence of PDs among depressed patients at 30% to 70% (Farmer and Nelson-Gray, 1990; Pilkonis and Frank, 1988; Shea et al., 1987).

We identified 12 empirical studies published since 1974 that investigated suicidal behavior in patients with depressive and personality symptomatology (see Table 1). Concurrent depression and PD diagnoses were associated with higher rates of serious suicide attempts (Fyer et al., 1988) and completed suicide (McGlashan, 1987) than patients with PD alone. Several studies found that patients with comorbid PDs and depression exhibited more suicidal ideation and attempts than patients with depression alone (Charney et al., 1981; Pfohl et al., 1984; Shea et al., 1987; Black et al., 1988). Finally, there is evidence that patients with comorbid affective disorders and Borderline PD make more suicide attempts and more highly lethal attempts than patients with other PDs or with affective disorders alone (Friedman et al., 1983).

Despite consistent findings indicating poor prognosis and increased risk of suicidal behavior in comorbid depressive disorders and personality disorders (Charney et al., 1981; Pfohl et al., 1984, 1987; Zimmerman et al., 1986), we identified no study to date that has systematically examined the relationship between dimensions of suicidal behavior and the full spectrum of DSM-III-R comorbid Axis II traits and personality disorders with Major Depression using structured instruments for the assessment

Table 1
Suicidal behavior in depression and personality disorders

Study	Population	Axis I	Axis II	Suicidal behavior	Results
Adam et al., 1983	Suicide attempters ($n = 98$) vs. controls ($n = 102$)	neurosis vs. psychosis (by clinical ratings)	personality disorder (by clinical ratings)	ideation and attempts (by patient report)	Index diagnosis of PD predicted persistent suicidal ideation and behavior at 18–24 months; neurosis did not
Black et al., 1988	Depressed inpatients with PD ($n = 76$) or without PD ($n = 152$)	DSM-III (by chart review)	DSM-III PDs (chart review)	ideation and attempts (by chart review)	Patients with comorbid depression and PD had increased ideation and attempts
Charney et al., 1981	Unipolar, nonmelancholic, depressed inpatients ($n = 160$)	DSM-III (by chart review)	DSM-III PDX (by chart review)	ideation (by patient report)	PD related to earlier onset of depression, worse treatment outcome, more suicidal ideation
Friedman et al., 1983	Inpatients with affective disorders ($n = 53$)	DSM-III (by SADS and chart)	DSM-III PDX (by clinical consensus)	behavior and lethality (SADS), attempts	Patients with comorbid affective d/o and BDL PD had more attempts and more highly lethal attempts than no PD or other PD groups
Fyer et al., 1988	Inpatients with Borderline PD ($n = 180$)	DSM-III (by chart review)	DSM-III PD (by chart review)	attempts rated for seriousness (by chart review)	Patients with comorbid major affective d/o or substance abuse and BDL PD had more serious attempts
Joffe and Regun, 1989	Outpatients with major depression ($n = 53$)	DSM-III; RDC(SADS-L)	MCM I Personality Disorder scales	attempts vs. nonattempts	Mean Borderline PD scores higher in attempters than in nonattempters
Lester et al., 1989	Suicide attempters with PD ($n = 182$) or depression ($n = 109$)	DSM-III depressive disorders	DSM-II PDs: alcohol, drug, or antisocial	attempts, SIS	Depressed attempters had fewer attempts but more suicidal intent than PD pts
McGlashan, 1987	Unipolar affective disorder (UNI; $n = 22$), BDL ($n = 55$) and comorbid UNI/BDL ($n = 21$)	DSM-III PD (by chart review)	DSM-III PD (by chart review)	threats/efforts (manipulative vs. serious), attempts, completions	UNI/BDL group higher risk of completed suicide (16%) than BDL (2%); UNI had rate of 8%
Murphy et al., 1983	Treated opiate addicts ($n = 533$)	RDC (by SADS)	DSM-III PD	attempts (by patient report)	Patients with history of attempts had higher lifetime rates of dysphoric d/o (incl Major Depression) and PD
Pfohl et al., 1984	Inpatients with Major Depression ($n = 78$)	DSM-III	DSM-III PD (by SIDP)	attempts, lethality	More frequent low-lethal attempts in patients with comorbid MDD and PD
Shea et al., 1987	Outpatients with MDD ($n = 249$)	RDC (and SADS)	PAF (by rater)	attempts	Patients with MDD and Cluster B PD had more attempts and younger age at MDD onset
Vieta et al., 1992	Suicide attempters with affective d/o ($n = 96$)	DSM-III-R (by chart review)	DSM-III-R (by chart review)	attempts, lethality	Patients with previous attempts more likely to have recurrent MDD or 1st episode MDD with concurrent PD

of Axis I, Axis II and suicidal behavior. We now report results of such a study. We evaluated personality disorders and suicidal behavior, both categorically and dimensionally, in psychiatric inpatients with Major Depressive Disorder, using standardized structured interviews. We hypothesized that PD pathology, as defined by DSM-III-R, would be related to suicidal behavior in this population, whereas severity of depressive symptoms would not. Moreover, the presence and severity of Borderline PD pathology was predicted to account for most of this variance, due to the apparent association of Borderline PD constituent traits with suicidal behavior.

2. Methods

2.1. Subjects

We studied 102 patients admitted to Western Psychiatric Institute and Clinic – a University-based private psychiatric hospital serving the local Pittsburgh catchment area as well as being a tertiary referral center for Western Pennsylvania and the bordering states of West Virginia and Ohio. All admissions to the hospital were reviewed to identify possible study cases. Patients aged 18–80 years who met DSM-III-R (American Psychiatric Association, 1987) criteria for a current Major Depressive Episode were eligible for the protocol. Patients having major medical illnesses, organic mental disorders, or estimated IQs less than 80 were excluded. The initial daily screening procedure included an inspection of the hospital admission case notes and an informal interview with the patient, at which time the written informed consent was obtained for participation in the study as required by the Institutional Review Board for Biomedical Research.

2.2. Demographics

Patients ranged in age from 18–64 years (mean = 34.9 ± 10.6). Forty-six were male and 56 were female. Most of the subjects were white (78%) and a substantial minority were African-American (21%). More than half the patients (60%) had a history of at least one previous suicide attempt. Sixty-six percent

of this sample had recurrent Major Depression, whereas the remainder were in their first major depressive episode. On admission, the patients had an average Hamilton Depression Rating Scale (24-item) score of $29.6 (\pm 7.4)$.

2.3. Procedures

Diagnoses were established according to DSM-III-R at a consensus diagnostic conference, where at least two of the authors were present, on the basis of standardized structured clinical interviews and other clinical information (e.g., chart review, interview with relative). Axis I disorders were assessed using the Structured Clinical Interview for DSM-III-R-Patient Version (SCID-P (Spitzer et al., 1989)). Axis II personality disorders were evaluated initially using a pilot version of the Personality Disorder Examination (PDE) (Loranger et al., 1987) and subsequently the International Personality Disorder Examination (IPDE) (Loranger et al., 1991). The PDE and IPDE interviews provide dimensional ratings as well as categorical classifications of PD pathology. Both versions of the interview have been found to have good interrater reliability and temporal stability. Intraclass correlation coefficients for rater agreement on number of criteria assigned to subjects have ranged from 0.74 to 0.95 for the PDE (Loranger et al., 1991) and from 0.71 to 0.92 for the IPDE (Loranger et al., 1994). Stability coefficients have ranged from 0.60 to 0.76 for the PDE (Loranger et al., 1991) and from 0.58 to 0.84 for the IPDE (Loranger et al., 1994). The PDE or IPDE interview was administered towards the end of hospitalization, in order to minimize the effect of depression on the assessment of personality disorder pathology.

Severity of depression was assessed using the Hamilton Depression Rating Scale (HDRS) (Hamilton, 1960) and the self-report Beck Depression Inventory (BDI) (Beck et al., 1961). The Beck Hopelessness Scale (Beck et al., 1989) assessed hopelessness about the future. A detailed history of suicidal behavior was obtained from each subject, as well as ratings of suicidal ideation just prior to hospitalization (Scale for Suicidal Ideation) (Beck et al., 1979), using a structured interview format. The medical damage level of the most lethal lifetime suicide attempt was assessed using a modified version of the

Lethality Rating Scale (Beck et al., 1975), which scores the actual physical consequences of the attempt, using a 0–7 scale (i.e., 0 = no medical damage, through 7 = extensive damage with death likely) with specific anchors across methods of suicide attempt referring to the clinical condition of the subject. For all methods, a lethality rating of 3 or greater is given only when medical intervention is necessary. Whenever possible, hospital records and/or interviews with family members were sought to confirm the subject's report of the physical consequences of the attempt.

2.4. Data management and analyses

In order to test hypotheses regarding differences in suicidal behavior in patients with and without DSM-III-R PDs (specifically Borderline vs. non-Borderline Cluster B vs. other PDs), subjects were divided into four groups: (a) no diagnosis on Axis II ($n = 44$); (b) positive diagnosis of Borderline PD ($n = 30$); (c) positive diagnosis of a Cluster B disorder other than Borderline ($n = 17$); and (d) positive diagnosis of a non-Cluster B PD (including Personality Disorder NOS; $n = 11$). Univariate analyses of variance were performed to test mean differences across groups on dimensional variables. Cross-classification analyses were performed to test group differences on categorical variables (Pearson χ^2 or Fisher's Exact Test where appropriate).

Dimensional ratings of PDs were calculated by summing the number of criteria met for each disorder for those subjects interviewed with the IPDE ($n = 84$). Summed dimensional scores for Borderline PD criteria (removing the suicidal behavior criterion), Cluster A PD criteria, other Cluster B PD (not Borderline) criteria and Cluster C PD criteria were tested for correlation with suicidal behavior measures. Separate stepwise regression analyses were then performed with number of suicide attempts, age at first suicide attempt and medical damage of most lethal suicide attempt as the dependent variable in each case. Borderline PD dimensional scores were included as an independent variable as well as interview and self-report depression ratings, suicidal ideation prior to hospitalization and hopelessness scores. Because one of the DSM-III-R criteria for Borderline PD involves suicidal behavior, the effect

of this criterion on categorical and dimensional analyses was evaluated, and this criterion was removed from the dimensional score for Borderline PD for the regression analyses. All data analytic procedures were performed using the Statistical Package for the Social Sciences (SPSS-PC⁺/Version 5.0).

3. Results

3.1. Categorical analyses of personality disorder psychopathology, suicidal behavior and clinical characteristics

Patients with Major Depression having comorbid Borderline Personality Disorder (Borderline PD group) differed from those with no PD diagnoses, those with other Cluster B diagnoses (i.e., Antisocial, Histrionic and Narcissistic PDs) and those with other PD diagnoses in several ways. Patients with Borderline PD were more likely to have a history of one or more suicide attempts than were patients in the other three groups (see Table 2). Further, they were more likely to have made a high number of suicide attempts (≥ 3) and to have been younger at time of first suicide attempt than the No PD and the Other PD groups. Severity of suicidal ideation immediately prior to index hospitalization also differed across the groups due to greater severity in the Borderline PD group. It is noteworthy that the Borderline PD patients did not differ in the rate of high lethality suicide attempt (defined as lifetime attempt requiring medical treatment or hospitalization), with 74% of the Borderline PD group having made an attempt causing significant medical damage, as compared to 71% in the No PD group, 64% in the Cluster B–Not Borderline PD group and 67% in the Other PD group.

As shown in Table 3, the groups also differed on clinical characteristics other than suicidal behavior. The Borderline PD group had a younger mean age at first psychiatric hospitalization than the No PD and Other PD groups, as well as having a higher percentage of female patients. Further, the four groups showed different levels of objective and subjective depression. Whereas the Other PD group had a higher mean level of depression than the other three groups as measured by the Hamilton Depression

Table 2
Group differences on suicidal indicators

Variable	No personality disorder (<i>n</i> = 44)	Borderline personality disorder (<i>n</i> = 30)	Cluster B–Not borderline (<i>n</i> = 17)	Other personality disorder (<i>n</i> = 11)
Attempt status ¹				
Non-attempters	27 (61%)	3 (10%)	6 (35%)	5 (45%)
Attempters	17 (39%)	27 (90%)	11 (65%)	6 (55%)
Number of suicide attempts ²				
Low (0–3)	40 (91%)	17 (57%)	14 (82%)	9 (82%)
High (≥ 3)	4 (9%)	13 (43%)	3 (18%)	2 (18%)
Maximum attempt lethality				
Low (< 3)	5 (29%)	7 (26%)	4 (36%)	2 (33%)
High (≥ 3)	12 (71%)	20 (74%)	7 (64%)	4 (67%)
Age at first suicide attempt ³ (mean ± SD)	33.5 ± 14.4 <i>n</i> = 17	21.9 ± 7.0 <i>n</i> = 27	24.2 ± 11.7 <i>n</i> = 11	34.7 ± 10.6 <i>n</i> = 6
Suicidal ideation ⁴ (mean ± SD)	15.0 ± 10.2 <i>n</i> = 41	23.8 ± 10.9 <i>n</i> = 28	18.3 ± 8.6 <i>n</i> = 16	15.6 ± 12.1 <i>n</i> = 9

¹ Fisher's Exact test = 21.14, *df* = 3, *P* < 0.001.

² Fisher's Exact test = 11.80, *df* = 3, *P* < 0.01.

³ *F*(3,57) = 5.45, *P* < 0.01.

⁴ *F*(3,90) = 4.18, *P* < 0.01.

Rating Scale (HDRS), the Borderline PD and Other PD groups had greater self-reported depression (BDI) and hopelessness than the No PD group. Finally, the percentages of patients with comorbid psychoactive substance use disorders were higher in the Borderline PD and Cluster B – Not Borderline PD groups. Rates of hospitalization did not distinguish any of the groups.

The groups also differed in terms of overall level of PD pathology (see Table 4). The Borderline PD and Cluster B–Not Borderline PD groups had significantly more PD criteria than the other two groups when criteria were summed across all disorders. Further, the Borderline PD and Cluster B–Not Borderline PD groups had more Cluster B criteria than the other two groups, as would be expected, but also had equally as many Cluster A and C criteria as the Other PD group. Examination of the relative levels of PD pathology in suicide attempters versus non-attempters across the four diagnostic groups using 2-way analyses of variance indicated a significant main effect of diagnostic group for each set of PD criteria (see Table 4). A significant main effect of suicide attempt status was found for each of the Cluster B criteria sets (Borderline criteria, Cluster B–Not Borderline criteria and total Cluster B criteria), such that suicide attempters were found to have greater numbers of criteria for Cluster B PDs. No

effect of attempter status was found for Cluster A or C criteria or for total Axis II criteria, and no interaction effects were significant.

To exclude potential confounding effects due to the Borderline PD criterion relating to repeated suicidal threats or behavior, we examined the effect of removing this criterion when diagnosing Borderline PD. Of those patients initially diagnosed with Borderline PD (*n* = 30), 11 patients no longer received this diagnosis when the suicidal threats/behavior criterion was removed (i.e., these patients met the minimum number of 5 criteria for the diagnosis, one of which was the suicidal threats/behavior criterion). A comparison of these 11 patients with the 19 patients whose diagnosis of Borderline PD remained regardless of the suicidal criterion indicated no statistically significant differences.

3.2. Dimensional analyses of personality disorder pathology, suicidal behavior and clinical characteristics

Correlations were computed between indicators of the severity of suicidal behavior and dimensional ratings of personality disorders (i.e., summed number of criteria met for Borderline PD, Cluster A PDs, Cluster C PDs and Cluster B PDs other than Borderline) for all subjects evaluated with the IPDE (*n* =

Table 3
Group differences on clinical characteristics

Variable	No personality disorder	Borderline personality disorder	Cluster B–Not Borderline	Other personality disorder
Age at first hospitalization ¹	35.4 ± 12.9 ^a n = 39	25.0 ± 6.7 ^b n = 29	30.3 ± 8.4 n = 16	34.5 ± 11.8 ^a n = 11
Ham-D (24-item) ²	29.4 ± 6.9 ^a n = 44	27.8 ± 7.5 ^a n = 30	28.2 ± 5.5 ^a n = 16	37.2 ± 7.6 ^b n = 11
BDI ³	23.0 ± 10.6 ^a n = 34	32.4 ± 12.8 ^b n = 20	20.6 ± 8.8 n = 11	33.8 ± 12.2 ^b n = 8
Hopelessness scale ⁴	9.0 ± 5.9 ^a n = 34	13.3 ± 5.5 ^b n = 25	8.4 ± 4.4 n = 12	14.4 ± 5.6 ^b n = 10
Sex ⁵				
No. Male (%)	18 (41%)	7 (23%)	15 (88%)	6 (55%)
No. Female (%)	26 (59%)	23 (77%)	2 (12%)	5 (45%)
Substance Abuse/Dependence ⁶				
Absent	25 (57%)	10 (33%)	3 (18%)	7 (64%)
Present	19 (43%)	20 (67%)	14 (82%)	4 (36%)
Prior hospitalizations				
Low (< 2)	31 (71%)	14 (47%)	12 (75%)	8 (73%)
High (≥ 2)	13 (29%)	16 (53%)	4 (25%)	3 (27%)

Note: Group means marked a and b across rows are significantly different from each other ($P < 0.05$; Student-Newman-Keuls comparisons).

¹ $F(3,91) = 5.91$, $P < 0.01$.

² $F(3,97) = 5.23$, $P < 0.01$.

³ $F(3,64) = 3.86$, $P < 0.05$.

⁴ $F(3,76) = 3.28$, $P < 0.05$.

⁵ Fisher's Exact Test = 19.76, $df = 3$, $P < 0.001$.

⁶ Fisher's Exact Test = 10.79, $df = 3$, $P < 0.05$.

84). Borderline PD criteria were most strongly associated with indices of suicidal behavior. The severity of Borderline PD pathology (i.e., the number of Borderline PD criteria met after subtracting the suicidal threats/behavior criterion) was positively correlated with number of suicide attempts ($r = 0.45$, $P < 0.001$) and severity of suicidal ideation immediately prior to hospitalization ($r = 0.32$, $P < 0.01$) and negatively correlated with age at first suicide attempt ($r = -0.42$, $P < 0.001$). These results are consistent with those obtained using a categorical diagnosis of Borderline PD (shown in Table 2).

Stepwise regression analyses were then performed with Borderline PD criteria, objective and subjective depression ratings, hopelessness scores and suicidal ideation as the independent variables in each case. Number of previous suicide attempts, age at first suicide attempt and medical damage of most lethal attempt were the dependent variables in separate analyses. For number of suicide attempts and age at

first attempt, we found that severity of Borderline PD psychopathology (with the suicidal threats/behavior criterion removed) was the best single predictor (Multiple $R = 0.500$, $P < 0.001$ for number of suicide attempts; $R = 0.43$, $P < 0.01$ for age at first suicide attempt). None of the other independent variables met criteria for inclusion in the equations ($PIN = 0.05$). Maximum attempt lethality was not significantly predicted by any of the independent measures.

These analyses were then repeated, including only those subjects without any PD diagnosis, in order to investigate the stability of these results in patients with less severe personality pathology. Correlations between PD criteria sets and suicidal indices indicated that criteria for Cluster B PDs were most strongly associated with suicidal behaviors in these subjects. Thus, the regression analyses described above were repeated for this subgroup, with the only difference being the replacement of Borderline PD

Table 4
Group differences on personality disorder pathology

Criterion group (total No. items)	No personality disorder ($n = 39$) ^a	Borderline personality disorder ($n = 22$) ^a	Cluster B – Not Borderline ($n = 14$) ^a	Other personality disorder ($n = 9$) ^a	2-way Analysis of Variance
Total PD Criteria (93)					
Attempters	6.9 ± 4.2	20.0 ± 6.1	16.8 ± 2.8	12.4 ± 2.7	Diagnostic group: $F(3,76) = 33.8$, $P = 0.000$
Non-attempters	4.5 ± 3.6	13.5 ± 0.7	18.0 ± 8.8	12.8 ± 6.4	Attempter status: $F(1,82) = 2.0$, $P = 0.158$
Cluster A Criteria (23)					
Attempters	0.6 ± 1.1	2.2 ± 2.8	1.6 ± 1.6	1.2 ± 1.1	Diagnostic group: $F(3,76) = 7.2$, $P = 0.000$
Non-attempters	0.4 ± 0.8	4.5 ± 2.1	2.7 ± 1.8	2.5 ± 2.1	Attempter status: $F(1,76) = 1.5$, $P = 0.228$
Cluster B Criteria (36)					
Attempters	4.1 ± 2.4	10.3 ± 2.9	13.3 ± 2.7	3.6 ± 2.3	Diagnostic group: $F(3,76) = 44.2$, $P = 0.000$
Non-attempters	1.5 ± 2.3	5.0 ± 0.0	10.2 ± 5.4	1.8 ± 1.3	Attempter status: $F(1,76) = 18.4$, $P = 0.000$
Borderline Criteria (8)					
Attempters	1.7 ± 1.2	5.9 ± 0.8	2.9 ± 1.0	1.0 ± 0.7	Diagnostic group: $F(3,76) = 71.0$, $P = 0.000$
Non-attempters	0.6 ± 1.2	5.0 ± 0.0	1.7 ± 1.2	1.0 ± 0.8	Attempter status: $F(1,76) = 14.1$, $P = 0.000$
Clus B-Not BDL Criteria (28)					
Attempters	2.4 ± 2.0	4.4 ± 2.6	10.4 ± 2.8	2.6 ± 2.1	Diagnostic group: $F(3,76) = 39.0$, $P = 0.000$
Non-attempters	0.9 ± 1.4	0.0 ± 0.0	8.5 ± 4.7	0.8 ± 1.0	Attempter status: $F(1,76) = 11.3$, $P = 0.001$
Cluster C Criteria (34)					
Attempters	2.2 ± 2.1	7.6 ± 3.2	1.9 ± 1.8	7.6 ± 2.1	Diagnostic group: $F(3,76) = 19.6$, $P = 0.000$
Non-attempters	2.6 ± 2.7	4.0 ± 1.4	5.2 ± 3.0	8.5 ± 3.8	Attempter status: $F(1,76) = 0.9$, $P = 0.337$

^a n , number of cases in the group of respondents; only cases interviewed with IPDE ($n = 84$) were used in these analyses.

criteria with Cluster B criteria as an independent variable. Despite the absence of diagnosable personality disorder in these subjects, severity of Cluster B PD psychopathology was still the best predictor of past suicide attempts (Multiple $R = 0.55$, $P = 0.006$). However, the addition into the equation of suicidal ideation immediately prior to hospitalization added significantly to this prediction (Multiple $R = 0.66$, $P = 0.002$). Age at first attempt was not significantly related to any of the predictors for this subgroup of patients.

4. Conclusions

In the current study, we investigated the relationship between comorbid DSM-III-R defined personality disorders and suicidal behavior in a sample of inpatients with Major Depressive Disorder. As predicted, we found that the presence and severity of DSM-III-R Axis II personality disorder psychopathology was positively related to indicators of suicidality. Our findings indicated that comorbid Borderline PD in particular characterizes a subgroup of patients with MDD at risk for multiple, serious suicide attempts. In fact, a higher rate of suicidal acts was largely a feature of the presence and severity of comorbid Borderline PD psychopathology, regardless of any other comorbid personality disorder diagnoses. These findings support previous research suggesting that the presence of personality psychopathology, and especially a diagnosis of Borderline PD, may increase risk of suicidal behavior (Morrison, 1982; Frances et al., 1986; Seager, 1986; Paris et al., 1987; Stone et al., 1987; Raczek et al., 1989).

Group differences also supported previous findings (Charney et al., 1981; Pfohl et al., 1984, 1987; Shea et al., 1987; Black et al., 1988; Zimmerman et al., 1986) suggesting that MDD with comorbid Borderline PD carries a higher risk for attempted suicide than MDD alone. Not only were almost all patients with a diagnosis of Borderline PD suicide attempters (90%), with a substantial percentage of patients having 3 or more suicide attempts (43%), but those with comorbid Borderline PD were also no less damaging in their most lethal suicide attempt than were those with other PDs or without any PD. Despite our fairly strict criteria regarding what constitutes a suicide

attempt (a self-destructive act with the intent to die), most of the Borderline PD patients fell into the even more dangerous category of those making an attempt causing significant medical damage requiring medical treatment. Whereas clinical folklore and some empirical studies indicate that patients with a diagnosis of Borderline PD tend to make frequent, trivial suicidal gestures that are not highly life-threatening (Pfohl et al., 1984; Lester et al., 1989), our findings and other research suggests that when this diagnosis occurs with a depressive disorder, it can also lead to serious suicide attempts (see Table 1). The belief that patients with Borderline PD manipulate others through repeated self-damaging acts, while it may have a basis in reality, may also persuade clinicians not to take such patients seriously. Our results, on the other hand, support previous findings suggesting that a diagnosis of Borderline PD in conjunction with a depressive disorder may be a dangerous combination (Friedman et al., 1983; Frances et al., 1986), regardless of the presumed intent of the patient.

The higher rate of suicidal behavior in the comorbid MDD and Borderline PD group cannot be explained by a higher level of depressive symptoms in this group. We found that MDD patients with Borderline PD exhibited a level of depression equivalent to the other groups when depression was rated by a structured clinical interview. The patients with Borderline PD scored higher on self-reported depression and hopelessness than patients with no PDs or other Cluster B PDs. However, the patients with other PDs scored equally highly on these self-report measures, but did not have elevated suicidal behavior, ruling out differences in depression and hopelessness as an explanation of the higher level of suicidal behavior in the Borderline PD group.

Dimensional assessments allowed for the weighing of relative contributions of different PD and state-related symptom traits to the variance in suicidal behavior. We found that the severity of Borderline PD psychopathology (i.e., number of criteria met for the disorder) was most strongly related to many suicidal indicators in this population and was a better statistical predictor of suicidal indices than was depression, hopelessness, or even suicidal ideation. These results support our hypothesis that higher levels of suicidal behavior in the Borderline PD group are due to a vulnerability for suicidal

behavior in these patients that is reflected in personality traits associated with this disorder (such as impulsivity and hostility). This lower threshold for suicidal behavior is then exceeded in the presence of a stressor, such as a major depressive episode (Malone et al., 1993). This explanation was further supported by our findings regarding differences among the groups in amount and type of PD psychopathology, as well as other clinical differences. The Borderline PD group and the Cluster B–Not Borderline PD group had more overall personality pathology than the other two groups, as indicated by the average total number of PD criteria met across all disorders. These two groups also had similar trait levels of impulsive, dramatic and aggressive behaviors (Cluster B criteria), but significantly more so than the other two groups, as would be expected. Further, both Cluster B groups had significantly higher percentages than the other two groups of psychoactive substance abuse and dependence disorders, which are quite characteristic of persons with Cluster B PDs. Moreover, substance abuse has been associated with suicidal behavior (Fowler et al., 1986) and might thus be considered a confounding variable. However, whereas both Cluster B groups exhibited high levels of such disorders, only the Borderline PD group combined extreme expressions of Cluster B personality traits (including substance abuse) with high levels of subjective depression and hopelessness, and this group clearly was at greatest risk for lifetime suicidal behavior.

Not only do Axis II Borderline PD traits in patients with MDD have a dose loading effect for the likelihood of suicidal behavior, they appear to lead to the earlier expression of such behavior in the patient's lifetime. That is, more Borderline PD constituent traits appear to lead to more and earlier manifestations of suicidal behavior in this population. Such a contention is supported by the finding that the Borderline PD group also had a significantly younger age at first suicide attempt and age at first psychiatric hospitalization than the other patients, and that Borderline PD constituent traits were correlated with younger age at first suicide attempt and first psychiatric hospitalization across all patients.

Interestingly, traits of Cluster B PDs were associated with suicide attempter status across all diagnostic groups. That is, suicide attempters met more

criteria for the Cluster B disorders regardless of whether they had a diagnosis of any PD. Further, dimensional analyses indicated that even for those subjects with no Axis II diagnoses, Cluster B personality traits were the most effective statistical predictor of the number of past suicide attempts, followed by suicidal ideation. In terms of other PDs, no differences were found between attempters and non-attempters in numbers of Cluster A (Odd/Eccentric Cluster) or Cluster C criteria met (Fearful/Anxious Cluster). Despite this finding, the possibility exists that certain Cluster A or C PD traits may be unrelated to suicidal behavior (e.g., Obsessive-Compulsive PD traits), whereas traits of other disorders may lead to a vulnerability (e.g., Passive-Aggressive PD traits). Such possible differential effects should be explored in a larger sample allowing for more detailed statistical comparisons.

In summary, the presence of Borderline PD psychopathology in psychiatric inpatients with MDD represents a significant trait-related risk factor for early-onset, serious suicidal behavior. Severity of comorbid Axis II psychopathology should be considered when assessing suicide risk in such patients. Even when no positive diagnosis of Borderline or any other PD is present, subthreshold levels of PD pathology, especially Cluster B symptom criteria, may indicate an increased risk for suicidal acts. Studies of preventive interventions targeting this high-risk comorbid population are warranted.

Acknowledgements

Assistance with patient recruitment and assessments was provided by Donna Abbondanza, R.N., Diane Dolata, R.N., and Thomas Kelly, ACSW. This work was partially supported by MH48514 and MH46745 (J.J. Mann, M.D., Principal Investigator), and by MH16804 awarded to E.M. Corbitt, Ph.D., through the Clinical Research Training in Psychiatry program at Western Psychiatric Institute and Clinic, C.F. Reynolds III, M.D., Director.

References

- Adam, K.S., Valentine, J., Scarr, G. and Streiner, D. (1983) Follow-up of attempted suicide in Christchurch. *Aust. NZ J. Psychiatry* 17, 18–26.

- American Psychiatric Association (1987) Diagnostic and statistical manual of mental disorders, 3rd Edn. APA Press, Washington, DC.
- Barraclough, B. and Pallis, D.J. (1975) Depression followed by suicide: a comparison of depressed suicides with living depressives. *Psychol. Med.* 5, 55–61.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J. and Erbaugh, J. (1961) An inventory for measuring depression. *Arch. Gen. Psychiatry* 4, 53–63.
- Beck, A.T., Beck, R. and Kovacs, M. (1975) Classification of suicidal behaviors: I. Quantifying intent and medical lethality. *Am. J. Psychiatry* 132(3), 285–287.
- Beck, A.T., Kovacs, M. and Weissman, A. (1979) Assessment of suicidal intention: The scale for suicide ideation. *J. Consult. Clin. Psychol.* 47(2), 343–352.
- Beck, A.T., Brown, G. and Steer, R.A. (1989) Prediction of eventual suicide in psychiatric inpatients by clinical ratings of hopelessness. *J. Consult. Clin. Psychol.* 57(2), 309–310.
- Black, D.W., Bell, S., Hulbert, J. and Nasrallah, A. (1988) The importance of Axis II in patients with major depression. *J. Affect. Disord.* 14, 115–122.
- Bourgeois, M. (1991) Serotonin, impulsivity and suicide. *Hum. Psychopharmacol* 6, s31–36.
- Brown, G.L., Goodwin, F.K., Ballenger, J.C., Goyer, P.F. and Major, L.F. (1979) Aggression in humans correlates with cerebrospinal fluid amine metabolites. *Psychiatry Res.* 1, 131–139.
- Brown, G.L., Ebert, M.H., Goyer, P.F., Jimerson, D.C., Klein, W.J., Bunney, W.E. and Goodwin, F.K. (1982) Aggression, suicide, and serotonin: relationships to CSF amine metabolites. *Am. J. Psychiatry* 139, 741–746.
- Bulik, C.M., Carpenter, L.L., Kupfer, D.J. and Frank, E. (1990) Features associated with suicide attempts in recurrent major depression. *J. Affect. Disord.* 18, 29–37.
- Charney, D.S., Nelson, J.C. and Quinlan, D.M. (1981) Personality traits and disorder in depression. *Am. J. Psychiatry* 138, 1601–1604.
- Coccaro, E.F. (1992) Impulsive aggression and central serotonergic system function in humans: an example of a dimensional brain-behavior relationship. *Int. Clin. Psychopharmacol.* 7, 3–12.
- Coccaro, E.F. and Kavoussi, R.J. (1991) Biological and pharmacological aspects of Borderline Personality Disorder. *Hosp. Community Psychiatry* 42, 1029–1033.
- Coccaro, E.F., Siever, L.J., Klar, H.M., Maurer, G., Cochrane, K., Cooper, T.B., Mohs, R.C. and Davis, K.L. (1989) Serotonergic studies in patients with affective and personality disorders. *Arch. Gen. Psychiatry* 46, 587–599.
- Farmer, R. and Nelson-Gray, R.O. (1990) Personality disorders and depression: hypothetical relations, empirical findings, and methodological considerations. *Clin. Psychol. Rev.* 10, 453–476.
- Fawcett, J., Scheftner, W., Clark, D., Hedeker, D., Gibbons, R. and Coryell, W. (1987) Clinical predictors of suicide in patients with major affective disorders: A controlled prospective study. *Am. J. Psychiatry* 144(1), 35–40.
- Fowler, R.C., Rich, C.L. and Young, D. (1986) San Diego Suicide Study: II. Substance abuse in young cases. *Arch. Gen. Psychiatry* 43, 962–965.
- Frances, A., Fyer, M. and Clarkin, J. (1986) Personality and suicide. *Ann. NY Acad. Sci.* 487, 281–293.
- Friedman, R.C., Aronoff, M.S., Clarkin, J.F., Corn, R. and Hurt, S.W. (1983) History of suicidal behavior in depressed borderline inpatients. *Am. J. Psychiatry* 140, 1023–1026.
- Fyer, M., Frances, A., Sullivan, T., Hurt, S.W. and Clarkin, J. (1988) Suicide attempts in patients with borderline personality disorder. *Am. J. Psychiatry* 145, 737–739.
- Goldstein, R.B., Black, D.W., Nasrallah, A. and Winokur, G. (1991) The prediction of suicide: Sensitivity, specificity, and predictive value of a multivariate model applied to suicide among 1906 patients with affective disorders. *Arch. Gen. Psychiatry* 48, 418–422.
- Guze, S.B. and Robins, E. (1970) Suicide among primary affective disorders. *Br. J. Psychiatry* 117, 437–438.
- Hamilton, M. (1960) A rating scale for depression. *J. Neurol. Neurosurg. Psychiatry* 23, 56–62.
- Hawton, K. (1987) Assessment of suicide risk. *Br. J. Psychiatry* 150, 145–153.
- Joffe, R.T. and Regan, J.J. (1989) Personality and suicidal behavior in depressed patients. *Compr. Psychiatry* 30(2), 157–160.
- Lester, D., Beck, A.T. and Steer, R.A. (1989) Attempted suicide in those with personality disorders. *Eur. Arch. Psychiatr. Neurol. Sci.* 239, 109–112.
- Loranger, A.W., Susman, V.L., Oldham, J.M. and Russakoff, L.M. (1987) The Personality Disorder Examination: A preliminary report. *J. Personal. Disord.* 1, 1–13.
- Loranger, A.W., Lenzenweger, M.F., Gartner, A.F., Susman, V.L., Herzig, J., Zammit, G.K., Gartner, J.D., Abrams, R.C. and Young, R.C. (1991) Trait-state artifacts and the diagnosis of personality disorders. *Arch. Gen. Psychiatry* 48, 720–728.
- Loranger, A.W., Sartorius, N., Andreoli, A., Berger, P., Buchheim, P., Channabasavanna, S.M., Coid, B., Dahl, A., Diekstra, R.F.W., Ferguson, B., Jacobsberg, L.B., Mombour, W., Pull, C., Ono, Y. and Regier, D.A. (1994) The International Personality Disorder Examination: The World Health Organization/Alcohol, Drug Abuse, and Mental Health Administration International Pilot Study of Personality Disorders. *Arch. Gen. Psychiatry* 51, 215–224.
- Malone, K.M., Myers, J.M., Haas, G.L., Mieczkowski, T.A., Sweeney, J.A. and Mann, J.J. (1992) Psychobiologic predictors of reattempted suicide. American Psychiatric Association Annual Meeting (Abstract)
- Malone, K.M., Haas, G.L., Sweeney, J.A. and Mann, J.J. (1993) Familial effects on attempted suicide and depression. American Psychiatric Association Annual Meeting, San Francisco, CA, NR119.
- Mann, J.J. (1987) Psychobiologic predictors of suicide. *J. Clin. Psychiatry* 48 (12 Suppl.), 39–43.
- Mann, J.J. (1991) Integration of neurobiology and psychopathology in a unified model of suicidal behavior. *Excerpta Med. Int. Congress Series* 968 1, 114–117.
- Mann, J.J., McBride, P.A., Brown, R.P., Linnoila, M., Leon,

- A.C., DeMeo, M.D., Mieczkowski, T.A., Myers, J.E. and Stanley, M. (1992) Relationship between central and peripheral serotonin indexes in depressed and suicidal psychiatric inpatients. *Arch. Gen. Psychiatry* 49(6), 442–446.
- McGlashan, T.H. (1987) Borderline personality disorder and unipolar affective disorder. *J. Nerv. Ment. Dis.* 175, 467–473.
- Morrison, J.R. (1982) Suicide in a psychiatric practice population. *J. Clin. Psychiatry* 43, 348–352.
- Murphy, S.L., Rounsaville, B.J., Eyre, S. and Kleber, H.D. (1983) Suicide attempts in treated opiate addicts. *Compr. Psychiatry* 24, 79–89.
- Paris, J., Brown, R. and Nowlis, D. (1987) Long-term follow-up of borderline patients in a general hospital. *Compr. Psychiatry* 28, 530–535.
- Pfohl, B., Stangl, D. and Zimmerman, M. (1984) The implications of DSM-III personality disorders for patients with major depression. *J. Affect. Disord.* 7, 309–318.
- Pfohl, B., Coryell, W., Zimmerman, M. and Stangl, D. (1987) Prognostic validity of self-report and interview measures of personality disorder in depressed inpatients. *J. Clin. Psychiatry* 48, 468–472.
- Pilkonis, P.A. and Frank, E. (1988) Personality pathology in recurrent depression: Nature, prevalence, and relationship to treatment response. *Am. J. Psychiatry* 145, 435–441.
- Pokorny, A.D. (1964) Suicide rates in various psychiatric disorders. *J. Nerv. Ment. Dis.* 139, 499–506.
- Raczek, S.W., True, P.K. and Friend, R.C. (1989) Suicidal behavior and personality traits. *J. Personal. Disord.* 3(4), 345–351.
- Roy, A. (1982) Risk factors for suicide in psychiatric patients. *Arch. Gen. Psychiatry* 39, 1089–1095.
- Roy, A. (1993) Features associated with suicide attempts in depression: A partial replication. *J. Affect. Disord.* 27, 35–38.
- Seager, C.P. (1986) Suicide in neurosis and personality disorder. In: Roy, A. (Ed.), *Suicide*. Williams and Wilkins, Baltimore, MD, pp. 113–121.
- Shea, M.T., Glass, D.R., Pilkonis, P.A., Watkins, J. and Docherty, J.P. (1987) Frequency and implications of personality disorders in a sample of depressed outpatients. *J. Personal. Disord.* 1(1), 27–42.
- Siever, L.J. and Davis, K.L. (1991) A psychobiological perspective on the personality disorders. *Am. J. Psychiatry* 148, 1647–1658.
- Soldz, S., Budman, S., Demby, A. and Merry, J. (1993) Representation of personality disorders in circumplex and five-factor space: Explorations with a clinical sample. *Psychol. Assessment* 5, 41–52.
- Spitzer, R.L., Williams, J.B.W., Gibbon, M. and First, M.B. (1989) *Instruction Manual for the Structured Clinical Interview for DSM-III-R (SCID, 5/1/89 Revision)*, Biometrics Research Department, New York State Psychiatric Institute, New York, NY.
- Stone, M.H., Hurt, S.W. and Stone, D.K. (1987) The PI 500: Long-term follow-up of borderline inpatients meeting DSM-III criteria. I. Global outcome. *J. Personal. Disord.* 1, 291–298.
- Vieta, E., Nieto, E., Gasto, C. and Cirera, E. (1992) Serious suicide attempts in affective patients. *J. Affect. Disord.* 24, 147–152.
- Weissman, M.M. (1974) The epidemiology of suicide attempts, 1960 to 1971. *Arch. Gen. Psychiatry* 30, 737–746.
- Widiger, T.A. and Trull, T.J. (1992) Personality and psychopathology: An application of the five-factor model. *J. Pers.* 60, 363–393.
- Wiggins, J.S. and Pincus, A.L. (1989) Conceptions of personality disorders and dimensions of personality. *Psychol. Assessment* 1(4), 305–316.
- Zimmerman, M., Coryell, W., Pfohl, B., Corenthal, C. and Stangl, D. (1986) ECT response in depressed patients with and without a DSM-III personality disorder. *Am. J. Psychiatry* 143(8), 1030–1032.